

WHAT IS CLAIMED IS:

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1 A method for detecting and separating vertical and horizontal synchronous signals  
2 received by a monitor from a computer, comprising the steps of:

3 checking for inputs from a vertical synchronous signal terminal, a horizontal/composite  
4 synchronous signal terminal and a synchronous-on-green terminal of said computer to detect input  
5 forms of the vertical and horizontal synchronous signals from said computer; and

6 separating the vertical and horizontal synchronous signals from each other in accordance with  
7 the input forms detected during said step of checking and adjusting polarities of the separated  
8 vertical and horizontal synchronous signals.

1 2. The method as set forth in Claim 1, wherein said step checking comprises the steps  
2 of:

3 checking said horizontal/composite synchronous signal terminal to determine whether the  
4 horizontal synchronous signal is input;

5 checking said vertical synchronous signal terminal to determine whether the vertical  
6 synchronous signal is input, when it is determined that the horizontal synchronous signal is not input  
7 from said horizontal/composite synchronous signal terminal;

8 checking said synchronous-on-green terminal to determine whether said horizontal  
9 synchronous signal is input, when it is determined that the vertical synchronous signal is not input  
10 from said vertical synchronous signal terminal; and

11 making a determination that no synchronous signal has been input and returning to said step  
12 of checking said horizontal/composite synchronous signal terminal, when it is determined that the  
13 horizontal synchronous signal is not input from said synchronous-on-green terminal.

*I Claim :*

1           3.     The method as set forth in claim 2, further comprising the steps of:  
2                 checking said vertical synchronous signal terminal to determine whether the vertical  
3                 synchronous signal is input, when it is determined that the horizontal synchronous signal is input  
4                 from said horizontal/composite synchronous signal terminal;  
5                 determining whether said horizontal synchronous signal has a positive polarity or a negative  
6                 polarity, when it is determined that the horizontal synchronous signal is input from said  
7                 horizontal/composite synchronous signal terminal and the vertical synchronous signal is not input  
8                 from said vertical synchronous signal terminal;  
9                 setting the polarity of said horizontal synchronous signal to positive and beginning a vertical  
10                synchronous signal extraction mode, when it is determined that said horizontal synchronous signal  
11                has a positive polarity;  
12                checking said horizontal/composite synchronous signal terminal to determine whether the  
13                vertical synchronous signal is input;  
14                making a determination that only the horizontal synchronous signal is input from said  
15                horizontal/composite synchronous signal terminal and performing a corresponding synchronous  
16                signal separation process, when it is determined that said vertical synchronous signal is not input  
17                from said horizontal/composite synchronous signal terminal; and  
18                making a determination that a composite synchronous signal is input from said  
19                horizontal/composite synchronous signal terminal, that the polarity of said horizontal and vertical  
20                synchronous signals are both positive and performing a corresponding synchronous signal separation  
21                process, when it is determined that said vertical synchronous signal is input from said  
22                horizontal/composite synchronous signal terminal.

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1           4.     The method as set forth in claim 3, further comprising the steps of:  
2                 setting the polarity of said horizontal synchronous signal to negative and beginning a vertical  
3 synchronous signal extraction mode, when it is determined that said horizontal synchronous signal  
4 has a negative polarity;  
5                 checking said horizontal/composite synchronous signal terminal to determine whether the  
6 vertical synchronous signal is input;  
7                 making a determination that only the horizontal synchronous signal is input from said  
8 horizontal/composite synchronous signal terminal and performing a corresponding synchronous  
9 signal separation process, when it is determined that said vertical synchronous signal is not input  
10 from said horizontal/composite synchronous signal terminal; and  
11                 making a determination that a composite synchronous signal is input from said  
12 horizontal/composite synchronous signal terminal, that the polarity of said horizontal and vertical  
13 synchronous signals are both negative and performing a corresponding synchronous signal  
14 separation process, when it is determined that said vertical synchronous signal is input from said  
15 horizontal/composite synchronous signal terminal.

1           5.     The method as set forth in claim 3, further comprising the steps of:  
2                 determining whether said horizontal synchronous signal has a positive polarity or a negative  
3 polarity, when it is determined that the horizontal synchronous signal is input from said  
4 horizontal/composite synchronous signal terminal and the vertical synchronous signal is input from  
5 said vertical synchronous signal terminal;  
6                 setting the polarity of said horizontal synchronous signal to positive and beginning a vertical  
7 synchronous signal extraction mode, when it is determined that said horizontal synchronous signal  
8 has a positive polarity;

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9 checking said horizontal/composite synchronous signal terminal to determine whether the  
10 vertical synchronous signal is input; and

11 making a determination that a composite synchronous signal is input from said  
12 horizontal/composite synchronous signal terminal, that the polarity of said horizontal and vertical  
13 synchronous signals are both positive and performing a corresponding synchronous signal separation  
14 process, when it is determined that said vertical synchronous signal is input from said  
15 horizontal/composite synchronous signal terminal.

1 6. The method as set forth in claim 5, further comprising the steps of:

2 determining whether said vertical synchronous signal from said vertical synchronous signal  
3 terminal has a positive polarity or a negative polarity, when it is determined that said vertical  
4 synchronous signal is not input from said horizontal/composite synchronous signal terminal;

5 making a determination that separate horizontal and vertical synchronous signals are input,  
6 that said horizontal and vertical synchronous signals have a positive polarity and performing a  
7 corresponding synchronous signal separation process, when it is determined that said vertical  
8 synchronous signal from said vertical synchronous signal terminal has a positive polarity; and

9 making a determination that separate horizontal and vertical synchronous signals are input,  
10 that said horizontal synchronous signal has a positive polarity, that said vertical synchronous signal  
11 has a negative polarity and performing a corresponding synchronous signal separation process, when  
12 it is determined that said vertical synchronous signal from said vertical synchronous signal terminal  
13 has a negative polarity.

1 7. The method as set forth in claim 5, further comprising the steps of:

2 setting the polarity of said horizontal synchronous signal to negative and beginning a vertical  
3 synchronous signal extraction mode, when it is determined that said horizontal synchronous signal  
4 has a negative polarity;

5 checking said horizontal/composite synchronous signal terminal to determine whether the  
6 vertical synchronous signal is input; and

7 making a determination that a composite synchronous signal is input from said  
8 horizontal/composite synchronous signal terminal, that the polarity of said horizontal and vertical  
9 synchronous signals are both negative and performing a corresponding synchronous signal  
10 separation process, when it is determined that said vertical synchronous signal is input from said  
11 horizontal/composite synchronous signal terminal.

1 8. The method as set forth in claim 7, further comprising the steps of:

2 determining whether said vertical synchronous signal from said vertical synchronous signal  
3 terminal has a positive polarity or a negative polarity, when it is determined that said vertical  
4 synchronous signal is not input from said horizontal/composite synchronous signal terminal;

5 making a determination that separate horizontal and vertical synchronous signals are input,  
6 that said horizontal synchronous signal has a negative polarity, that said vertical synchronous signals  
7 has a positive polarity and performing a corresponding synchronous signal separation process, when  
8 it is determined that said vertical synchronous signal from said vertical synchronous signal terminal  
9 has a positive polarity; and

10 making a determination that separate horizontal and vertical synchronous signals are input,  
11 that said horizontal and vertical synchronous signals have a negative polarity and performing a  
12 corresponding synchronous signal separation process, when it is determined that said vertical  
13 synchronous signal from said vertical synchronous signal terminal has a negative polarity.

1           9.     The method as set forth in claim 2, further comprising the steps of:  
2           making a determination that only the vertical synchronous signal has been input when it is  
3           determined that said vertical synchronous signal is input from said vertical synchronous signal  
4           terminal; and  
5           performing a corresponding synchronous signal separation process.

1           10.    The method as set forth in claim 2, further comprising the steps of:  
2           checking for input of said vertical synchronous signal from said synchronous-on-green  
3           terminal, when it is determined that said horizontal synchronous signal is input from said  
4           synchronous-on-green terminal;  
5           making a determination that only the horizontal synchronous signal has been input from said  
6           synchronous-on-green terminal and performing a corresponding synchronous separation process,  
7           when it is determined that said vertical synchronous signal is not input from said synchronous-on-  
8           green terminal; and  
9           making a determination that the vertical and horizontal synchronous signals are input from  
10          said synchronous-on-green terminal, setting the polarity of said vertical and horizontal synchronous  
11          signals to positive and performing a corresponding synchronous signal separation process, when it  
12          is determined that said vertical synchronous signal is input from said synchronous-on-green  
13          terminal.

1           11.    The method as set forth in claim 3, wherein said step of making a determination that  
2           only the horizontal synchronous signal is input from said horizontal/composite synchronous signal

terminal and performing a corresponding synchronous signal separation process further comprises a step of clamping a front porch of the horizontal synchronous signal to a reference level.

12. The method as set forth in claim 3, wherein said step of making a determination that a composite synchronous signal is input from said horizontal/composite synchronous signal terminal, that the polarity of said horizontal and vertical synchronous signals are both positive and performing a corresponding synchronous signal separation process further comprises a step of clamping a back porch of the horizontal synchronous signal to a reference level.

13. The method as set forth in claim 4, wherein said step of making a determination that only the horizontal synchronous signal is input from said horizontal/composite synchronous signal terminal and performing a corresponding synchronous signal separation process further comprises a step of clamping a front porch of the horizontal synchronous signal to a reference level.

14. The method as set forth in claim 4, wherein said step of making a determination that a composite synchronous signal is input from said horizontal/composite synchronous signal terminal, that the polarity of said horizontal and vertical synchronous signals are both negative and performing a corresponding synchronous signal separation process further comprises a step of clamping a back porch of the horizontal synchronous signal to a reference level.

15. The method as set forth in claim 5, wherein said step of making a determination that a composite synchronous signal is input from said horizontal/composite synchronous signal terminal, that the polarity of said horizontal and vertical synchronous signals are both positive and performing

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4 a corresponding synchronous signal separation process further comprises a step of clamping a back  
5 porch of the horizontal synchronous signal to a reference level.

1 16. The method as set forth in claim 6, wherein said step of making a determination that  
2 separate horizontal and vertical synchronous signals are input, that said horizontal and vertical  
3 synchronous signals have a positive polarity and performing a corresponding synchronous signal  
4 separation process further comprises a step of clamping a back porch of the horizontal synchronous  
5 signal to a reference level.

1 17. The method as set forth in claim 6, wherein said step of making a determination that  
2 separate horizontal and vertical synchronous signals are input, that said horizontal synchronous  
3 signal has a positive polarity, that said vertical synchronous signal has a negative polarity and  
4 performing a corresponding synchronous signal separation process further comprises a step of  
5 clamping a front porch of the horizontal synchronous signal to a reference level.

1 18. The method as set forth in claim 7, wherein said step of making a determination that  
2 a composite synchronous signal is input from said horizontal/composite synchronous signal terminal,  
3 that the polarity of said horizontal and vertical synchronous signals are both negative and performing  
4 a corresponding synchronous signal separation process further comprises a step of clamping a back  
5 porch of the horizontal synchronous signal to a reference level.

1 19. The method as set forth in claim 8, wherein said step of making a determination that  
2 separate horizontal and vertical synchronous signals are input, that said horizontal synchronous  
3 signal has a negative polarity, that said vertical synchronous signals has a positive polarity and



performing a corresponding synchronous signal separation process further comprises a step of clamping a front porch of the horizontal synchronous signal to a reference level.

20. The method as set forth in claim 8, wherein said step of making a determination that separate horizontal and vertical synchronous signals are input, that said horizontal and vertical synchronous signals have a negative polarity and performing a corresponding synchronous signal separation process further comprises a step of clamping a front porch of the horizontal synchronous signal to a reference level.

21. The method as set forth in claim 1, further comprising a step of generating reference vertical and horizontal synchronous signals when no input is detected during said step of checking for inputs from said vertical synchronous signal terminal, said horizontal/composite synchronous signal terminal and said synchronous-on-green terminal of said computer.

22. The method as set forth in claim 2, wherein said step of making a determination that no synchronous signal has been input further comprises a step of generating reference vertical and horizontal synchronous signals.

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23. A method for detecting and separating vertical and horizontal synchronous signals received by a monitor from a computer, comprising the steps of:  
checking for inputs from a vertical synchronous signal terminal, a horizontal/composite synchronous signal terminal and a synchronous-on-green terminal of said computer to detect input forms of the vertical and horizontal synchronous signals from said computer;

6       generating reference vertical and horizontal synchronous signals when no input is detected  
7       during said step of checking for inputs from said vertical synchronous signal terminal, said  
8       horizontal/composite synchronous signal terminal and said synchronous-on-green terminal of said  
9       computer; and

10       separating the vertical and horizontal synchronous signals from each other in accordance with  
11       the input forms detected during said step of checking and adjusting polarities of the separated  
12       vertical and horizontal synchronous signals.

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